Patent claims

1. Phosphorus-containing polymer, suitable for coating dielectric surfaces, of the general formula I or II,

$$P(A)_m(F)_{n1}(U)_{o1} \quad (I)$$

$$P(A)_m(UF_{n2})_{o2} \quad (II)$$

in which

P stands for a linear or branched, uncrosslinked or crosslinked, homo- or heteropolymeric polymer component,

A stands for identical or different phosphorus-containing groups bonded to P,

m stands for a number from 3 to approximately 1000,

F stands for identical or different functional groups bonded directly or indirectly to P, which are present in addition to A,

n1 stands for a number from 1 to approximately 1000,

n2 stands for a number from 1 to approximately 100,

U stands for identical or different, linear or branched, uncrosslinked or crosslinked oligomeric or polymeric segments, made up of identical or different monomers, which are bonded to P,

o1 stands for a number from 0 to approximately 1000,

o2 stands for a number from 1 to approximately 1000.

2. Polymer according to Claim 1, characterized in that it contains phosphorus-containing groups A in an amount of from 0.001 to 10 mEq (milliequivalents), preferably from 0.01 to 5 mEq, in particular from 0.1 to 3 mEq.

3. Polymer according to Claim 1 or 2, characterized in that it contains functional groups F in an amount of from 0.001 to 20 mEq, preferably from 0.01 to 10 mEq, in particular from 0.5 to 10 mEq.

4. Polymer according to one of Claims 1, 2 or 3, characterized in that it contains segments U in an amount of from 0.001 to 20 mEq, preferably from 0.01 to 10 mEq, in particular from 0.5 to 10 mEq.

5. Polymer according to one of the preceding claims, characterized in that the polymer has an average molar mass of from 1000 to 10,000,000 g/mol, preferably from 2100 to 1,000,000 g/mol, particularly preferably from 5000 to 500,000 g/mol, most preferably from 5000 to 300,000 g/mol, in particular from 10,000 to 150,000 g/mol.

6. Polymer according to one of the preceding claims, characterized in that the polymer component P is a statistical copolymer or block copolymer.

7. Polymer according to one of the preceding claims, characterized in that the polymer component P is hydrophilic.

8. Polymer according to one of the preceding claims, characterized in that it contains phosphorus-containing groups A in the form of a spacer carrying from one to six identical or different phosphorus-containing radicals.

9. Polymer according to one of the preceding claims, characterized in that it contains functional groups F that can form covalent bonds, coordination bonds or take part in biochemical recognition reactions.

10. Polymer according to one of the preceding claims, characterized in that it contains functional groups F with crosslinkers.

11. Polymer according to one of the preceding claims, characterized in that the segments U have a molar mass, or average molar mass, of from 100 to 10,000.

12. Polymer according to one of the preceding claims, characterized in that the groups or segments U are hydrophilic.

13. Process for preparing a polymer according to one of Claims 1 to 12 by copolymerizing

(A) a monomer containing a phosphorus-containing group A, or a plurality of identical or different monomers containing identical or different phosphorus-containing groups A

with

(B) a monomer containing a functional group F, or a plurality of identical or different monomers containing identical or different functional groups F, and

(C) optionally, a monomer containing a segment U, or a plurality of identical or different monomers containing identical or different segments U,

to form a polymer of the formula I,

or with

(B′) a monomer containing a unit $(UF_{n2})_{o2}$ according to formula II, or a plurality of identical or different monomers containing identical or different units of the formula $(UF_{n2})_{o2}$ according to formula II,

to form a polymer of the formula II.

14. Process for preparing a polymer according to one of Claims 1 to 12 by

(i) preparing a polymer, which forms the polymer component P and carries identical or different functional groups that are suitable as functional groups F, preferably hydroxyl groups, carboxyl groups, derivatives of carboxyl groups and/or amine groups,

(ii) reacting some of the functional groups to form identical or different phosphorus-containing groups A, and

(iii) optionally, reacting some of the functional groups to form identical different segments U,

wherein step (iii) can be carried out after, before or together with step (ii), and wherein not all the functional groups are converted in steps (ii) and (iii), and the unreacted functional groups form the functional groups F of the polymer.

15. Process according to one of the preceding claims, characterized in that some or all of the functional groups that have not been converted in steps (ii) and (iii) are reacted with one or more identical or different crosslinkers to form functional groups F.

16. Use of a polymer according to one of Claims 1 to 12 for coating dielectric materials, in particular dielectric waveguides.

17. Use according to the preceding claim, characterized in that the polymer is used for coating dielectric materials, in particular dielectric waveguides, made of TiO_2, Ta_2O_5, ZrO_2, HfO_2 or Al_2O_3, preferably of TiO_2 or Ta_2O_5.

18. Optical signal transducer having a coated dielectric waveguide, characterized in that the coating consists of a polymer according to one of Claims 1 to 12.

19. Use of an optical signal transducer having a coated dielectric waveguide according to the preceding claim for immobilizing chemical and/or biochemical recognition elements.